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ABSTRACT

Studies of creativity have generally dealt with the creative act, typically defined as the statistically infrequent approach to problem solving. A study was conducted to determine whether a relationship exists between problem discovery and originality of the written product, and whether problem-finding behavior may be observed in student writers. The subjects were matched pairs of middle school students. Eight high creative students matched with eight low creative students entered a room one at a time and were instructed to arrange any or all of 15 objects on an empty table and then to create a piece of writing. A tape recorded session was held immediately after the writing was completed. Results of holistic evaluation showed that scores for the creative writers were consistently higher, indicating a relationship between problem finding and product originality. (Tables of findings are included.) (DF)

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THE RELATIONSHIP BETWEEN THE ORIGINALITY OF ESSAYS AND VARIABLES IN THE PROBLEM-DISCOVERY PROCESS: A STUDY OF CREATIVE AND NONCREATIVE MIDDLE SCHOOL STUDENTS

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Running Head:

Originality of Essays and the Problem-Discovery Process

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Abstract

The study was conducted to determine whether there is a relationship between problem-discovery and the assessed originality of the written product, and to determine whether problem-finding behavior is observable in student writers. This relationship was examined at two stages: the problem-formulation and problem-solution stages. Two groups of middle school writers participated in the study. A high creative group and a low creative group were identified. Students, singly, came into a room with two tables; one table had fifteen readily identified objects and the other table was empty. Students were instructed to arrange any or all the objects on the empty table and to then create a piece of writing pleasing to themselves. The variables measuring problem formulation and solution behavior were objects touched, uniqueness of objects chosen, objects manipulated, prewriting time, total time, changes in object reality, changes in object perspective and fluency. Products were evaluated holistically by two groups of judges on originality, craftsmanship and aesthetic value. Results indicate a relationship between problem-finding and the originality of the product. The creative group scores were higher, though not always significantly, than the noncreative group scores in a direction one would predict based on correlative research done with artists. The way a student approaches a writing problem is directly related to the originality of the product.

THE RELATIONSHIP BETWEEN THE ORIGINALITY OF ESSAYS AND VARIABLES IN THE PROBLEM-DISCOVERY PROCESS: A STUDY OF CREATIVE AND NON-CREATIVE MIDDLE SCHOOL STUDENTS

Much has been written about creativity, but little is known about the origins of the creative act. What we do know has generally come from retrospective accounts of creative behavior by those recognized as having produced a creative product. These accounts have been, for the most part, attempts to describe the setting in which the product was created.

Studies of creativity have generally dealt with the creative act, typically defined as the statistically infrequent approach to the problem. Since an unusual solution may be the product of a divergent response to a problem, such responses may require either a modification of the problem or an unusual approach that may involve risk on the part of the problem solver. Thus, the critical issue in problem-solving may be problem-formulation.

Although there is much literature on problem-solving, little can be found on problem-formulation. With the exception of Getzels (1964) and Getzels and Csikszentmihalyi (1975) who have discussed the concept in detail, both theories and empirical evidence about problem-finding are sparse. However, several investigators have noted the importance of discovering the problem.

Einstein and Infield (1938) state:

> The formulation of a problem is often more important than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle, requires imagination and marks real advance in science. (p. 92)

The focus on problem-formulation was continued by Wertheimer (1959), who affirmed that the productive question is more important and often a greater achievement than the solution. Ernest Hilgard (1959) first differentiated between the types of problems that may be discovered, those that concern finding the "correct answer" and those that go beyond such "correct answer" problems.

Later Getzels (1964) distinguished three types of problems. The first is the "presented" or known problem. In this instance the problem is known or given and there are standard procedures for solving it. The second type of problem is the "discovered" problem. The discovered problem is at the opposite extreme of the presented problem. The discovered problem has no known formulation, no consistent or recognized method of solution. The problem itself must be identified without the aid of a series of procedures that will ultimately lead to a solution.

Between the extremes of the presented problem and the discovered problem, Getzels (1964) suggests there is a range of problems involving various degrees of what is known and unknown, requiring various degrees of innovation and creativeness for solution" (p. 242).

The only study that has dealt with discovery-oriented behavior as the first step in the creative process was conducted by Getzels and Csikszentmihalyi (1964) with art students. The purpose of their research was to determine whether discovery-oriented behavior in a situation involving creative production was related to the assessed creativity of the product. This study is important to my research because it provided part of my rationale and design.

Getzels and Csikszentmihalyi studied 31 art students from one of the foremost art schools in the country. Each student was asked to produce a

drawing from 27 objects placed on a table. The students were told to take any or all the figures and arrange them as they wished on an empty table. The students were then to work on a drawing until they felt it was completed.

Discovery-oriented behavior was determined at both the problem formulation stage and the problem solution stage. The students were scored on the number of objects handled, the uniqueness of the objects chosen, and the selection and arrangement of the objects. A total problem-formulation score was derived from these observations.

The problem solution was measured by (a) the openness of the problem structure ascertained by photographs taken at six-minute intervals, (b) discovery-oriented behavior while drawing, including behavior such as switching mediums, changing paper, pauses in drawing, or substituting objects, and (c) changes in problem structure and content (whether or not the students merely copied the objects or changed perspectives). The art students were interviewed following the completion of the drawing, and their answers were evaluated on a 1 to 5 scale indicating a low or high concern for discovery.

The results indicated a strong relationship between discovery-oriented behavior during the formulation of the problem and the originality of the drawing as rated by the judges. The investigators noted that the operationalization of the notion of discovery at the problem-formulation stage marked the first empirical evidence of the problem-finding notion.

Although Getzels and Csikszentmihalyi's research was done with artists, there is reason to assume a similar relationship between problem finding and assessed originality of the product in student writers. As with artists, writers must "discover" and formulate a problem to be solved in the composition, and this discovery-oriented behavior can be hypothesized to

have a relationship with a finished written product. The finished product of writers can be reliably assessed for originality (Getzels and Csikszentmihalyi, 1976) and this in turn can be compared with the discovery behavior of the writer.

The present study replicated the Getzels and Csikszentmihalyi study with student writers to determine whether the relationship between problem finding and the originality of the final product would hold for writing as well as for drawing.

Although my study deals with writers, an effort was made to use the same means of assessment and variables as did the study with artists. Therefore, the assessments of both process and product replicate the work of Getzels and Csikszentmihalyi (1976).

Method

Subjects

The students selected for this study were matched pairs of middle school students. The majority of students are from a suburban-rural area and have middle to upper middle class backgrounds. The students attend a public school in Western Pennsylvania.

Eight students identified through three measures as creative were matched with eight low creative students using sex, grade, and IQ (only those with an IQ above 125 were included in order to control for any intelligence-creativity interaction).

Materials

Fifteen objects were chosen to present a variety of choices among simple and complex, human and mechanical, abstract and concrete. Several of the objects were similar to those used in the Getzels and Csikszentmihalyi study (1976). The objects were: a small manikin, a bunch of plastic grapes, a woman's velvet hat, a brass horn, an antique book, a glass prism, a microscope, Bible, paper clip, stapler, a phonograph record, an art reprint from a New Yorker cover showing desks in a classroom, a slide rule, a calculator and an English text book. These objects were placed on one table; a second, empty table was placed nearby. The following instructions were developed to parallel those in the Getzels and Csikszentmihalyi (1976) study.

> Consider the objects on this table. Choose as many as you wish, rearrange them in any way you wish on the other table, handle them as much as you want. Your task is to produce any piece of writing as long as it is pleasing to you. You may take as long as you wish. You may use any or all of the objects in your writing.

A tape recorded interview session was held immediately following the writing. The questions were used to confirm the observation record. Questions were adopted from the Getzels and Csikszentmihalyi (1976) study with artists.

Measures

Four sets of measures were used: measures of creativity (for selecting the sample), of problem formulation, of problem solution, and of the quality of the final product.

Selection

Students were identified for inclusion in the study based upon their responses to the Group Inventory for Finding Interests (Davis-Rimm, 1982). This is a sixty-item inventory based on items and concepts from the Group Inventory for Finding Creative Talent and from Davis's (1975) How Do You Think Test. Reliability coefficients are in the .85 to .90 range. Validity coefficients using combined criteria of teacher ratings plus ratings of the writing samples have a median of .35 and range from .20 to .69

In addition to this measure, each student was identified as creative or noncreative by a teacher and an appropriate administrator using a seven-item checklist created by Davis and Rimm (1977).

Because each measure alone has questionable validity, the results of all three measures were combined to determine creative potential and non-creative potential. Scores from each of the three measures were converted to a three-point scale (creative = 1, unsure = 2, and noncreative = 3) and were combined. Students with three (1) scores were considered to be "creative"; students with three (3) scores were considered to be "not creative."

Problem Formulation

Five measures of problem formulation were developed:

Number of objects manipulated. How many of the fifteen objects were handled by a student before writing, based on the record kept by the observer.

Uniqueness of the objects chosen. This was based on an analysis of all objects chosen and arranged by all the students. The most common object

selected received a value of 1, the second most common a 2, and so on. These values were then added for each arrangement.

Exploratory behavior during selection and arrangement. A score of 1 was given if objects were just picked up and placed on the second table, score of 2 if the student was observed holding the object for closer observation, score of 3 for manipulation of the object, score of 5 when observation and manipulation occurred together.

Prewriting time. The total time spent from the time instructions were given until the student began writing the composition.

Total time. The time instructions were given until the student indicated closure.

Total problem formulation. Scores on each variable were connected to a five point scale and summed.

Problem-Solution Stage

Three measures of the nature of the problem solution were used:

Changes in object reality. An A was given if the writer simply described all the objects on the second table. A B was given if there were changes in the perspective of the objects. A C was given if any of the objects were used in an obviously symbolic way. A D was given if the objects appeared in the paper in a manner other than that suggested by the objects on the table. For example, if the grapes were thrown in text rather than described. An E was given if no student selected objects from the table were used.

In scoring this variable, A may appear alone or with any other category, B must occur with C since any change in perspective will render the object symbolic. B may occur with any other category since each object is its own entity. C may occur without B. An object may be used as a symbol,

for example, as "old" or "new" without a change in physical perspective. C may occur with any other category. D must occur with B or C since any object used in a manner other than suggested by the arrangement must be symbolic or changed in perspective, but D may also occur with any other category. E may occur alone or with any other category. E used alone indicates no objects at all were used.

Each letter was given a value of 1 except E which was Ø and the combinations added together to measure the number of changes in object reality.

Use of objects to create order or new perspective. This perspective variable was determined by observing how objects were used in the text as well as evaluating student responses to the question, "Why did you arrange the objects as you did?" The text evaluation and interview question determined if objects were arranged to create a new perspective or a merger of objects, and whether the arrangements complemented fiction or nonfiction.

This variable was evaluated by separating essays and responses into two categories: plus or minus story, which means the student either wrote fiction or nonfiction. (There were no other categories.)

The arrangement of objects was evaluated if students arranged to give order to the presentation of objects in the text, or if objects were arranged to create a new perspective or a merger of objects. This differs from the previous variable which focused on th uses of objects in the text.

Students who wrote fiction and arranged the objects to give order to the presentation in the text received a 1. Students who wrote fiction and arranged the objects to create a new perspective received a 2. Students who wrote nonfiction and arranged the objects to give order to the arrangement in the text received a 3, and students who wrote nonfiction and arranged the

objects to give a new perspective received a 4 score. A Ø score indicated the student wrote fiction but used no objects.

Fluency. Fluency was the final word count of the finished product.

Total problem solution. Scores on each variable were converted to a five point scale and then summed.

Product

Two panels of five judges evaluated the written product. The first group of judges was chosen from middle school teachers of language arts. Essays were typed and grammar corrected before rating, in order to define craftsmanship as the technical skill of the work, not the use of conventions.

Each judge, independently rated each paper on three aspects: originality or imaginativeness, craftsmanship or technical skill, and aesthetic value.

Each judge rated the essays on a 1 (low) to 9 (high) point scale; no further instructions or definitions were given.

The second panel of judges, composed of teachers from other disciplines, received a framing definition of the product variables. Originality was defined as an infrequent or divergent response. Craftsmanship was defined as technical skill or organizational qualities or how well the essay is developed. Aesthetic value was defined as the lasting quality of the essay or how memorable it was. Again, each judge rated all essays on a 1 to 9 scale, for each of the three aspects.

Procedure

Each student wrote one composition. The writing took place in a laboratory situation with the investigator and one student per session. The

sessions were conducted after school in an empty classroom. The student sat in a regular classroom desk. In front of the student were the two adjacent tables. I sat to the right and behind the student with a clear view of both tables. This setting allowed me to photograph and code what the student was doing. A second table was left empty and used by the students to arrange the objects. Students completed the experimental task individually.

They were asked to write all notes and drafts on yellow paper which I supplied and to write their final draft on white paper which I also supplied. Students were interviewed immediately following completion of the assignment.

Results and Discussion

The data on problem-formulation are presented in Table 1.

The results indicate that the scores for the group of writers assessed as creative were consistently higher, significantly only for the number of objects touched score, and at the total score problem formulation stage was also significant. Assessed creative students had a significantly higher mean, 16.3, than the assessed noncreative group, 3.0. As a group, the students assessed as creative chose more objects to place on the second table, and these objects tended to be the least commonly chosen objects.

Table 2 presents the data on behavior during the problem solution stage. Both the change in object reality score and the fluency score were significant.

The results of the ratings by the judges are presented in Table 3. The results from the first group of judges, the English teachers, indicate that the creative group was considered to be significantly better on originality and aesthetic value but not different on craftsmanship. In fact the means for craftsmanship were identical.

The results of the ratings by the second group of judges (the non-language arts teachers) were similar on originality and aesthetic value, but they also rated the creative group significantly higher on craftsmanship. The second group of judges were also middle school teachers; however, they were chosen from disciplines other than language arts and were given common definitions of the three scores. Either of these differences may have led to the differences in ratings.

The correlations between the two groups of judges were .92 for the originality scores, .82 for craftsmanship, and .75 for aesthetic value ($df = 14$). Thus, although the two groups of judges disagreed on craftsmanship, their ratings were still highly correlated.

To summarize results so far, the pattern of scores for each variable at both the problem-solution stage and the problem-formulation stage indicates a difference between the two groups. The creative group scores were higher, although not always significantly higher, than the noncreative group scores in the direction one would predict from the correlative research of Getzels and Csikszentmihalyi (1976). Furthermore, ratings of the written products differed on originality and aesthetic value in the direction one would predict.

A crucial aspect of the Getzels and Csikszentmihalyi study was the overall relationship between the process and product scores.

Table 4 presents correlations between what the students did and said in the experiment and what language arts judges thought of the resulting essays.

As in the Getzels and Csikszentmihalyi study, a relationship exists between several process variables, including the total score and the judges' originality ratings. The correlation between the grand total score for the

process variables and the originality ratings was .58, very similar to the correlation of .65 (N = 31) that Getzels and Csikszentmihalyi (1976) reported between the same variables in their study of artists.

The relationship between the three product variables for all the variables suggests that the measures may not be independent. The correlations for all the judges between originality and craftsmanship was .66, between originality and aesthetic value was .77, and between craftsmanship and aesthetic was .82. The overall value of an essay may be due to the way it is crafted or organized in addition to its originality.

The relationship between problem-finding at both the problem-formulation and problem-solution stages and the assessed originality and aesthetic value of the written product was strongly supported by the data. The results indicate that the way a student approaches a writing problem, i.e., the problem-formulation stage, does correlate with originality of the written product. Merely touching objects, manipulating objects, choosing unique objects, or spending more time before writing does not cause a student to have original products. However, creative student writers who touched more objects, manipulated more objects, chose more unique objects and spent more time at this prewriting stage of the problem may be seeing more relationships between objects. I interpret this to indicate that an increased attempt to understand a deeper structure in the relationship among objects and how they co-occur has an effect on the originality of the written product.

These results concur with the correlative research of Getzels and Csikszentmihalyi (1976) who found a similar relationship with artists at the problem-formulation stage. The uniqueness and originality scores of the creative writers were significantly higher than these scores in the non-creative

group. Getzels and Csikszentmihalyi also found a significant, positive relationship between their unusualness scores and the originality rating of the finished drawing (Pearson r of .42). The artists who had the most original products were consistently higher than their counterparts on the problem-formulation variables. Thus, the artists and writers who had the most original products were both consistently higher on the process variables at both the problem-formulation and problem-solution stages.

Two conclusions are suggested by my data and the research of Getzels and Csikszentmihalyi. First, writers and artists who exhibit a concern for problem-discovery at the problem-formulation stage and problem-solution stage will have the most originally rated products. Second, during composing, before writing or drawing, student writers and artists share similarities in problem-discovery cognitive strategies even though the medium differs. This is more striking because the student writers were all middle school age students, while the artists were at a post high school level.

An important aspect of the Getzels and Csikszentmihalyi study was establishing problem-discovery as a behavior that exists prior to problem-solving in discovered rather than presented problem situations. Since this distinction was made in both studies, it is assumed that both problem structures in each study belong within the discovered problem rubric, thus problem-discovery behavior in artists and writers, regardless of age, is highly related to the originality of the finished product whether it be written or drawn. Both creative writers and artists appear to see more relationships between objects at a deeper structural level than do their less creative peers.

Although my study does indicate that creative students are consistently more original in their writing, the results warrant further investigation, especially by manipulating writing tasks.

If problem-formulation as a behavior prior to problem-solving does exist across writing situations, then we also need to determine whether non-creative writers can be taught to write products which will be more apt to be judged highly original by teaching problem formulation strategies.

Finally, if we can assume that the objects used in my study, readily identified by every student, are common to everyone's life experiences, then we might ask how a person's life experiences, the relationships between these experiences, and a person's approach to integrating these experiences affect or effect problem-finding as part of the process that leads to creative production. If we may assume that touching objects, manipulating concrete objects, or otherwise inspecting objects is a manifestation of the way writers and artists analyze feelings and synthesize life experience awareness, then touching and manipulating (the observables) may provide us a window for studying the unobservable ways students analyze and synthesize.

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Table 1

Behavior of Creative and Non-creative Students at the Problem Formulation Stage

Variable	Assessed Creative Group n=8 M	SD	Assessed Non-Creative Group n=8 M	SD	t for Correlated Means (df=7)	P. (1 tail)
Number of Objects Touched	5.4	3.07	3.0	3.67	-2.04	.040
Uniqueness of Objects	16.3	10.37	3.0	4.24	-3.46	.05
Objects Chosen & Placed	3.5	2.13	2.0	2.5	-1.47	.092
Prewriting Time	2.2	1.49	1.75	1.40	-1.28	.121
Total Time	57.7	24.10	49.30	28.40	-0.81	.222
Total Score	20.3	7.55	13.5	7.5	1.61	.07

Table 2

Behavior of Creative and Non-creative Students at the Problem-Solution Stage

Variable	Assessed Creative Group n=8 M	SD	Assessed Non-Creative Group n=8 M	SD	t for Correlated Means	P. (1 tail)
Change in Object Reality	11.0	4.2	5.6	5.4	-1.97	.045
Change in Perspective	1.4	.74	1.9	1.3	.94	.190
Fluency	349.3	155.5	233.5	126.0	-1.97	.045
Total Score	6.0	3.07	1.0	4.62	1.568	.10

Table 3

Quality of the Writing of Creative and Non-creative Students

Variable	Judges	Assessed Creative Group (n=8) M	SD	Assessed Non-Creative Group (n=8) M	SD	t for Correlated Means (df=7)	P. (1 tail)
Originality Group I	Language Arts Teachers	35.5	5.58	25.13	9.09	-5.14	.0005
Originality Group II	Non-Language Arts Teachers	31.6	4.98	23.00	8.80	-3.89	.003
Craftsmanship Group I	Language Arts Teachers	30.5	6.35	30.63	4.17	.08	.47
Craftsmanship Group II	Non-Language Arts Teachers	27.5	6.82	22.88	6.15	-2.67	.016
Aesthetic Value Group I	Language Arts Teachers	29.4	4.90	24.75	3.88	-3.78	.004
Aesthetic Value Group II	Non-Language Arts Teachers	26.3	6.80	20.00	5.35	-3.80	.004

Table 4

Correlations Between the Ratings by Five Judges on Three Dimensions of Evaluation and the Problem-Formulation Variables Observed

Process Variables	Dimensions of Evaluation (Product Variables)		
	Originality Total (n=16, df=14)	Craftsmanship Total (n=16, df=14)	Aesthetic Value Total (n=16, df=14)
Problem Formulation			
Objects Touched	.51*	.36	.12
Uniqueness of Objects Chosen	.30	-0.06	.01
Objects Chosen	.42	.13	-0.11
Prewriting Time	.63**	.75***	.30
Total Time	.52*	.48	.07
Total Problem Finding	.59*	.41	.12
Problem Solution			
Changes in Object Reality	.69**	.15	.20
Changes in Object Perspective	-.48	-0.16	-0.22
Fluency	.55*	.59*	.28
Total Problem Solution	.53*	.34	.18
Grand Total	.58*	.38	.09

* .05
** .01
*** .001

N=16

Post Hoc Interview Questions Following the Writing Assignment

1. Why did you write what you did?
2. What were you thinking while you were writing?

   What were your major concerns?
3. Could any elements of your paper be eliminated or changed without altering the paper's basic character?
4. What meaning does the paper have for you?
5. How did you begin your paper?

   Why did you choose this type of writing?
6. As you were arranging the objects did you know what you were going to write?
7. What did you think about before you started writing?
8. Why did you choose the objects as you did?

   Why did you arrange the objects as you did?
9. Did you plan as you wrote and if so, how did you go about doing that?
10. How did you get your ideas?
11. Did you change your mind as you wrote? If so, when?
12. Did you revise your writing? If so, when?
13. Do the responses of others have any effect on your writing?
14. How did you know when you had written enough?